

The Rouge Project: Implementing a General Storm Water Permit as Part of a Watershed Approach to Wet Weather Pollution Management

James E. Murray and Kelly A. Cave, PE, Wayne County Department of Environment,
415 Clifford, Detroit, Michigan, USA 48226

Dale S. Bryson, Camp Dresser & McKee, One Woodward Ave., Detroit Michigan 48226

Jack D. Bails, Public Sector Consultants, 600 W. St. Joseph, Lansing, Michigan 48933

ABSTRACT

Wayne County's Rouge River National Wet Weather Demonstration Project (Rouge Project) is a comprehensive program to restore the water quality and beneficial uses of the Rouge River, a tributary to the Detroit River in southeast Michigan which has been designated as a significant source of pollution to the Great Lakes system along the border between the United States and Canada. The Rouge River Watershed is largely urbanized, spans approximately 438 square miles, and is home to over 1.5 million people in 48 communities and 3 counties. Sources of pollution to the river include industrial and municipal point sources, storm water runoff, combined sewer overflows (CSOs), interflow from abandoned dumps, and resuspension of contaminated sediment. Approximately 50% of the watershed is served by separate sewer systems, with an additional 20% of the watershed served by combined sewers and the remaining area unsewered.

The early days of the Rouge Project were focused on alleviating the current loads of sewage and storm water discharged from the 150 CSO locations in the river from about 20% of the watershed area. Additional monitoring of the river showed that the other sources of pollution, such as storm water, needed to be controlled before full restoration of the river would be achieved throughout the watershed. The lack of a defined regulatory framework to address storm water pollution and diffuse sources of non-point pollution became a major obstacle to further progress in improving water quality and restoring beneficial uses to the Rouge River.

This paper describes the Rouge Project efforts to build institutional and regulatory frameworks necessary to accommodate a watershed approach to wet weather pollution management. Part of this framework is a new watershed-based general permit for storm water discharges issued under the federal National Pollutant Discharge Elimination System (NPDES) program. This storm water permit program was developed jointly by the Rouge communities and state and federal regulators and is based on the concept of cooperative, locally-based storm water and watershed management.

The Rouge Project is demonstrating that a watershed-based pollution management program, which provides flexibility and real delegation of authority to local stakeholder agencies to decide *how* to achieve water quality goals, is achieving faster and more cost-effective restoration and protection of water resources. Addressing all of the sources of impairment in the Rouge River, however, necessitated strong consensus building among the 48 community governments, 3 county governments, state and federal government, industries, environmental groups, and private citizens to show that they had a stake in restoring the Rouge River and that their participation was vital. This paper also describes these consensus building strategies,

critical to the success of this effort, which were used to engage numerous stakeholders, gain their support, provide them opportunities to influence decisions, and participate in actions to restore and sustain the Rouge River as a valuable community asset.

INTRODUCTION

The Rouge River National Wet Weather Demonstration Project (Rouge Project) is a watershed-based effort, sponsored by the U.S. Environmental Protection Agency (USEPA), to manage wet weather pollution to the Rouge River, a tributary to the Detroit River in southeast Michigan (**See Figure 1 “Location of Rouge Watershed in Michigan”**) which is designated as a significant source of pollution to the Great Lakes system by the International Joint Commission. The Rouge River watershed is largely urbanized, spans approximately 438 square miles, and is home to over 1.5 million people in the City of Detroit and 47 other communities. Sources of pollution to the river include industrial and municipal point sources, combined sewer overflows (CSOs), storm water runoff, interflow from abandoned dumps, discharges from illicit connections, discharges from failed on-site septic systems, and resuspension of contaminated sediment. All sanitary and combined sewers in the watershed are connected to the Detroit Wastewater Treatment Plant that discharges outside of the watershed into the Detroit River. Twenty percent of the watershed is served by combined sewers. Separate sanitary and storms sewers serve most of the remaining areas of the watershed with the exception of isolated pockets and rural areas in the headwaters that still have on-site septic systems.

The Rouge Project is designed to identify the most efficient and cost effective controls of wet weather pollution, while assuring maximum use of the resource. CSO controls are being implemented in phases. Under Phase 1, six communities are separating their sewers and eight communities are constructing 10 retention treatment basins. Each of these basins is sized for different design storms and several employ innovative technology. A two-year evaluation study of the CSO control basins began on June 1, 1997. These results coupled with efforts to control storm water and other pollution sources in the watershed will provide the basis for the Phase 2 CSO control program on the remaining CSO sources in the watershed. The information gained from the evaluation of design storms and control technologies will be useful nationwide on determining cost effective CSO controls to meet water quality standards.

The watershed contains 7 subwatersheds that range in size between 19 and 89 square miles (**See Figure 2**). Older communities served by combined sewers dominate downstream portions of the Rouge River Watershed, while the headwater areas are typically agricultural land, open space, or low density residential developments that are undergoing rapid change due to growth pressures. Fully developed areas, typical of the middle portions of the Rouge Watershed, have separated storm sewers and limited opportunities to address storm water problems with structural changes.

Data gathered for Wayne County and the MDEQ by the Rouge Project has shown the following:

- All areas of the watershed have reported problems with high bacteria levels and low dissolved oxygen levels during wet weather events,
- In eight of the 11 subwatersheds fish consumption is restricted beyond the standard restrictions due to the threat to human health,
- Nine of 11 subwatersheds have moderate to severe degradation of wildlife habitats,
- Fish populations have suffered severe impairment in six of the subwatersheds,
- There is moderate to severe impairment of aesthetic enjoyment in eight of the subwatersheds, and
- Restrictions to small boat navigation resulting from log jams, garbage and sedimentation, are a moderate to severe impairment in seven subwatersheds.

Although the early focus of the Rouge Project was on the control of CSOs in the older urban core portion of the watershed, in recent years the project has learned that many pollution problems stem from a lack of coordinated storm water management and non-point source pollution upstream of CSO discharges.

At the urging of the federal court overseeing the cleanup of the Rouge River (United States, et al. v. City of Detroit, et al. Case No. 77-71100), one of the first efforts of the Rouge Project was an independent study of financial and institutional arrangements for funding and implementing water pollution controls in the Rouge River. This study was completed in August of 1994, and recommended that the project expand considerations from combined sewer overflow issues to watershed-wide sources of pollution, including storm water from separated sewer systems in the newer suburbs (Murray and Bails, 1994). In March of 1995, a storm water management strategy for the Rouge River was presented to the Rouge Project Steering Committee and later to the elected leadership of the communities. The strategy was designed to develop a practical approach to reduce the water quality impacts of storm water discharges to the Rouge River through the application of watershed-wide management approaches.

The storm water strategy had six major elements: develop a baseline monitoring program; target investigations in identified problem areas; fund demonstration and pilot projects to remediate pollution sources and reduce flow variability; document institutional options and legal impediments to watershed-wide approaches; propose incentives to encourage voluntary participation by communities and other public agencies; and, adopt a plan for short term actions and iterative steps leading to comprehensive, watershed-wide storm water management. Three demonstration subwatersheds were selected to examine how a storm water management plans might differ between various areas within the watershed. The three subwatersheds selected represented the following: older, fully developed, suburban areas with both separated and combined sewers; rapidly developing areas in the headwaters of the Rouge River, with separated sewers and on-site septic systems; and, an area that was still undergoing development, but was primarily urbanized.

However before the strategy could be fully implemented, the federal court pushed the issue of a watershed-wide institutional structure using the Michigan State Drain Code to establish an institution to fund and manage water quality in the entire watershed. The watershed communities, without exception, expressed grave reservations about establishing such an institutional arrangement due to its restrictions in providing adequate representation and authority to the 48 communities involved.

The Wayne County Department of the Environment met with the Rouge watershed communities and

proposed an alternative regulatory framework -- a watershed-based general storm water permit issued under the NPDES program. The communities then asked the court for the opportunity to develop a draft permit acceptable to the communities as well as the state and federal regulatory agencies. The court agreed to provide the opportunity to the communities to attempt a consensus approach to a general storm water permit, but at the same hearing noticed all 48 communities that they were now parties to the case before the court. Previous to this time only those communities with CSO discharges were formally a part of the federal court process.

METHODOLOGY

It is within this context that the communities attempted to draft a consensus approach to a state general permit for the management of storm water within the Rouge River watershed and concurrently implement the other elements of a storm water management strategy including development of management plans in the three selected subwatersheds.

A core group of communities and representatives of the Surface Water Quality Division of the Michigan Department of Environmental Quality (MDEQ) with delegated responsibility for the NPDES program began to work together in the development of a watershed-based, general storm water permit. Staff of the Rouge Project provided facilitation and administrative support for the group. This group started the process from “the bottom up”. The communities outlined the issues that were important to them and how the permit conditions should be drafted to reflect their concerns. At its first meeting the CAG decided to outline the guiding principles that would be used to draft the permit. A list of 14 principles were eventually condensed from the numerous suggestions offered by the communities participating in the technical drafting subcommittee. These 14 principles in priority order are very briefly summarized below:

- Establish a watershed framework for practical, cost effective steps with a focus on protecting the water resource.
- Create incentives for communities to cooperate in establishing workable plans to improve and protect water quality.
- Provide certainty and legal protection for local communities and other regulated stakeholders.
- Allow access to the information and the resources of the Rouge Project, particularly baseline monitoring and problem identification.
- Local communities need the flexibility to select alternative approaches to reflect local conditions.
- Provide for an iterative process to reach long range goals while making steady progress without committing large resources for uncertain benefits.
- Permit local communities with their cooperating partners to select the institutional arrangement and financing approach that most appropriately meets their specific needs.
- Limit the number and type of state mandates to encourage communities to innovate in actions and schedules to accomplish locally determined objectives.
- Allow communities to apply for coverage on a voluntary basis.
- Establish a process that will allow integration of storm water management between adjacent communities that are in a common hydrologic basin.
- Accommodate holistic, systems planning approach that evaluates point and non-point sources,

flows, etc. that limit or threaten the resource and its beneficial uses, and considers a full range of solutions (e.g., effluent trading, interlocking permits conditions, contractual agreements, etc.).

- Recognize the importance of building local support for water quality improvements by including stakeholders in the establishment of local priorities, preparation of short range action plans and long range strategies, and evaluation of progress toward meeting objectives.

- Provide a model approach that can be readily transferred from the Rouge River to other urban areas.

- Meets or exceeds the expectations of the U.S. District Court to collectively address the water quality issues consistent with requirements of state and federal laws.

Throughout the process of developing the guiding principles and eventually the draft permit, the Wayne County Department of Environment through its Rouge Project staff brought additional information and resources to the CAG. The U.S. EPA had formed an Urban Wet Weather Flows Federal Advisory Committee (UWWFFAC) and Wayne County, on behalf of the Rouge Project communities, was selected to serve. The Watershed Subcommittee of the UWWFFAC was involved in similar discussions during the same time frame at the national level. The ideas and concepts emerging from this federal advisory group on watershed approaches to storm water management were shared with the Rouge CAG. The process to develop a Rouge River watershed storm water permit became a real life example of how a regulatory framework intended to encourage locally based, watershed management to protect and enhance water quality would actually work. Similarly, the Michigan communities and agencies that had recently been issued Phase I NPDES storm water permits were brought into the discussion to relate their experiences in attempting to meet regulations imposed upon them and to share their recommendations on the proposed watershed-based general permit.

A draft general NPDES permit was prepared by the Rouge Project late 1996. The Michigan Department of Environmental Quality (MDEQ) took the draft prepared on behalf of the communities and responded with a proposed state permit early in 1997. As might be expected, the first MDEQ draft permit shared with the communities differed from the one proposed by the local communities. The key points of contention on the draft permit centered around issues of control. While the proposed permit by the state offered “flexibility” in their words, the local view was that what the state viewed as flexibility was in reality a reversion to traditional command and control in which the local communities could request variances, exceptions or options, but it was up to the state agency to grant them. Despite assurances from the MDEQ that the state would be reasonable in its exercise of discretionary authority, local communities remained skeptical. The state responded by including provisions to allow communities and other public agencies the opportunity to drop out of the process without penalty once the state decisions were made to accept or reject locally-generated pollution prevention programs.

THE MICHIGAN GENERAL NPDES STORM WATER PERMIT

The final MDEQ watershed-based, general NPDES storm water permit was issued on July 31, 1997 and incorporates the following elements:

General:

- coverage will be voluntary until the final EPA Phase 2 storm water regulations are promulgated in 1999;
- only public agencies who own, operate, or control storm water are provided the opportunity for coverage;
- subwatershed size is established by the potential permittees during the application process;
- application and permit process have limited required actions, the focus is to establish desired outcomes.

Requires permittee to develop:

- Illicit Discharge Elimination Plan that has the goal of eliminating raw sewage discharges and includes addressing failing septic systems and improper connections of sanitary sewers to storm drains and open waterways.
- Public Education Plan
- In cooperation with others, a Watershed Management Plan to resolve water quality concerns which includes:
 - short and long term goals for the watershed
 - delineation of actions needed to achieve the goals
 - estimated benefits and costs of management options
 - an opportunity for all stakeholders to participate in the process
- Storm Water Pollution Prevention Initiative which includes evaluation and implementation of pollution prevention and good housekeeping practices and the evaluation and implementation of BMPs to minimize impacts of new development and redevelopment.
- Monitoring and Reporting Plan including schedule for revisions to the Watershed Management Plan

The subwatershed storm water management plans developed by the communities and other public agencies do not require state approval; however, the individual pollution prevention plans emanating from the watershed planning process require state approval.

RESULTS

As of December 1, 1998, 34 communities and agencies in the Rouge Watershed have submitted applications for coverage under the general storm water permit and a certificate of coverage has been issued to one community. An additional 4 communities and agencies have submitted all or part of their application in draft form to the state for preliminary review. Virtually all other communities and agencies who own, operate, or control storm water systems have formally indicated that they will apply for coverage by January 31, 1999.

The communities reorganized into 7 major subwatersheds from the original 11 delineated by the Rouge Project. Subwatershed management groups have formed for each area. These groups are very active, generally holding at least monthly meetings. Participants in these groups generally include technical staff from the communities, county roads agencies, county drains agencies, and county health departments, with local elected officials, representatives from environmental groups, and citizens participating in some groups. Recently, the groups have been focusing on their applications for permit coverage. In addition, many of the communities and agencies are already implementing pilot storm water management projects, developing needed ordinances, and other activities which are not actually required under the permit for another 2 years.

Institutional arrangements and financing options necessary to implement the general permit and subwatershed management plans are one of the many elements which the local communities are addressing in their working groups. Discussions to date indicate that these arrangements are likely to be substantially different in different subwatersheds. For example, some subwatersheds are likely to utilize the Michigan Drain Code (*Review of Michigan Drain Code of 1956*, RPO-NPS-SR02.00) to formalize their intergovernmental arrangements and financing. Other subwatersheds are likely to utilize existing organizations and relationships (e.g., public authorities such as sanitation agencies) to accomplish activities which require coordination beyond individual municipal boundaries.

As part of the subwatershed planning process, communities and agencies are also identifying issues which cross subwatershed boundaries. Rouge Project staff and the MDEQ are currently providing coordination of the individual subwatershed efforts and are assisting subwatersheds in developing a comprehensive strategy for addressing watershed-wide issues. The subwatershed communities are also identifying those activities such as public education and water quality monitoring which may be most cost-effectively performed throughout the entire watershed by a single entity. Institutional arrangements necessary for implementation of watershed-wide activities are also under investigation.

DISCUSSION

Before communities and/or agencies apply for a general storm water permit, several important decisions should be made about size of the watershed management area, permit coverage, enforcement and accountability, elements of the watershed plan, and the future of watershed management. After those decisions are made, other critical factors come into play, such as sharing resources required for public education, and staff for implementing the plan, once the application is made. This section discusses the decisions made by permittees in the process of applying for a general storm water permit.

Size of the Watershed Management Area.

Schueler in his paper, *Crafting Better Urban Watershed Protection Plans*, suggests that subwatersheds having a drainage area of 518 to 3885 hectares (2 to 15 square miles) in size provide the best scale from both a technical and a political basis on which to base management plans (Schueler, 1996). In part, his conclusion on optimum size was based upon the fact that with smaller units, a planning area would most likely be contained within one political jurisdiction. Of the 11 subwatersheds within the Rouge Watershed (See **Figure 2 “Rouge Watershed Communities with Subwatershed Boundaries”**), the smallest number of communities involved is four; and most have more than 6. Further, the number of government

agencies or organizations that influence water quality within a subwatershed is difficult to quantify. Because there are so many different governmental units within a subwatershed, self selection of the hydrologic unit to form storm water management plan works best.

The most important factors influencing the size of the subwatersheds for the development of storm water management plans have been the ability of adjacent communities within a hydrologic area to identify common concerns and opportunities for partnerships. The Rouge River Watershed is highly diverse in terms of population density, level of development, household income, and in-place storm and sanitary sewer infrastructure. The opportunities for restoring or protecting water quality are very different in areas where the land area is 90 percent developed versus those areas that are just undergoing rapid development of existing open, rural areas.

While the MDEQ has reserved final judgment on determining the size of the subwatersheds, the new general permit provides flexibility on the size selected and gives the local public agencies the opportunity to propose the watershed boundaries in their application for coverage that best meets their needs. The communities have resoundingly rejected proposals that would impose a new management authority over the entire Rouge River Watershed. Such an authority, according to the communities, would limit representation of local jurisdictions and fails to recognize the diversity and strong “home rule” in the region.

Local government leaders have been working in three demonstration subwatersheds as part of the Rouge Project over the last three years. As previously discussed, these three subwatersheds represent the range of development, population and water quality problems found among Rouge River subwatersheds. Government leaders have been able to develop a shared vision, goals and action plans in each of the Rouge Project demonstration subwatersheds through the formation of subwatershed advisory groups dedicated to discussing storm water management. Each group has established a mission and vision, identified problems for their area, set goals and objectives and initiated a storm water management study.

For example, after identifying problems and establishing goals and objectives, leaders in the Upper 2 group decided that it would be advantageous to add the land mass contained within the Upper 1 subwatershed since many of the political jurisdictions located in the Upper 1 were the same as in the Upper 2. Although this committed the group to examining a larger land area, officials realized the effort would be more efficient than going through two planning processes for an adjacent area. By allowing flexibility within the permit for this to happen naturally, the general permit process facilitated a better watershed approach.

Permit Coverage

Ideally, a watershed-based regulatory framework should encompass all dischargers so that pollution sources can be addressed holistically. Practically, it must be recognized that prior NPDES permit programs at the state and federal level are already in place for municipal and industrial point source waste treatment discharges, and for many industrial and commercial storm water discharges. The

MDEQ watershed-based, general storm water permit covers only public agencies that own, operate or control storm water conveyance systems that were not covered under the Phase I federal storm water regulations.

The MDEQ general permit does give communities the flexibility and encouragement to incorporate non-point source controls and pollution prevention activities as part of the required watershed management plan. While the coverage is limited to public agencies and their storm water discharges, credit for local actions to prevent pollution, control storm water flows, and regulate land uses has been included in the general permit.

For example, many communities have initiated pilot projects to evaluate how storm water best management practices (BMPs) will control storm water flows and prevent pollution. In some cases these pilot projects have permanently changed the way communities and/or government agencies deal with storm water. These management practices will be included as part of a watershed management plan, and credit will be given to the entities that are performing those functions.

Enforcement and Accountability

While the coverage is granted to individual public agencies under the MDEQ general storm water permit, joint applications are encouraged and a joint management plan is required for a defined hydrologic unit. Enforcement is based upon individual public agency pollution prevention (P2) Initiatives and the schedules for implementing those initiatives. The P2 Initiatives must be consistent with the jointly developed subwatershed management plan.

The general permit is outcome-oriented, giving the communities the opportunity to develop innovative approaches and their own schedules to achieve the priority water quality goals and objectives outlined in the locally generated subwatershed plan. The plan itself is subject to only MDEQ review and comment. The individual P2 Initiatives and schedules, however, must be approved by MDEQ. The application for coverage is voluntary (e.g. there is no current state or federal requirement mandating a storm water permit for communities serving populations under 100,000 population with separated sewers); however, once the P2 Initiative has been approved by MDEQ and accepted by the public agency, the required actions and schedules are enforceable.

The communities rejected the concept of a joint permit that would leave all communities involved in a subwatershed management area subject to penalties for the failure of one to meet requirements. Most communities embrace the concept of joint planning and in some cases shared responsibilities for joint actions— provided that they are only held individually accountable for those things for which they can exercise control. Community peer pressure may reinforce joint planning and shared responsibilities that emerge from subwatershed plans.

During the application stage, communities have found that sharing resources as part of joint planning is beneficial for accountability and economic purposes. For example, several communities have agreed to share staff resources to implement public information campaigns. These communities agreed that the problems they faced due to storm water were similar, and that one person could fulfill the information needs of the two communities; thus an agreement was made to split time between the two communities and to

utilize the same type of public education tactics whenever possible. Other communities are exploring ways to share responsibilities such as log jam removal, and other river maintenance activities required after wet weather events. Communities that share these type of responsibilities also share the accountability for fulfilling obligations.

Minimum Application Requirements

The communities requested that the application and permit process for the MDEQ general storm water permit limit the number of required actions and focus instead on establishing required outcomes. The MDEQ general storm water permit has just four substantive program elements required in the application. The application for coverage must include: the area of coverage and delineate known point sources of separate storm water discharges; an illicit connection elimination plan; and, a public education plan to reduce the discharge of pollutants. Even these limited application requirements and the prescribed elements created some concerns.

The communities recognized that the task of identifying each and every storm water discharge could be costly, time consuming and unproductive at the application stage. In many cases actual ownership and control of visible discharge pipes to the river may not even be known. During the comment period on the draft, the MDEQ responded to this concern by amending the permit so that maps of the separate storm water drainage system could be substituted for the enumeration of individual discharges. After the final permit was issued, some communities indicated that conducting a program to detect illegal connections to relatively new separate storm sewers was not as high of a priority as correcting failed on-site septic systems that dominate in some subwatersheds. In a permit workshop, the MDEQ concurred that it was illicit discharges from either improper sanitary connections or failed septic systems that needed to be addressed in a plan submitted at the time of application.

While the communities understood the need and support public education to reduce individual actions that result in pollution of storm water, they question the importance of specific plan requirements such as the need for “procedures for residential car washing.” Whereas, car washing can certainly be a concern in a residential area with paved streets, curb and catch basins, those communities representing rural suburbs with gravel roads and driveways questioned why developing public information on car washing should be a priority over other types of public information on pollution prevention relevant to their areas.

The point is that a regulation that requires specific actions of all communities regardless of circumstances or without regard to the potential beneficial outcomes, dilutes the resources available to address real problems and undermines the credibility of the regulation. One-size-fits-all requirements do not work well with diffuse sources of pollution. Requirements need to be flexible and they need to be outcome oriented.

Permit Requirements

Another key element in this regulatory framework is the requirement that the public agencies granted coverage under the permit must develop a joint watershed management plan by a specified date for an identified hydrologic area. The management plan requirements of the MDEQ general storm water permit are focused on elements that must be considered, expected outcomes and process. The permit requirements include: assessment of existing conditions; goal and objective setting through a public

participation process; identification of local priorities, problems and opportunities; consideration of options and selection of action plans; implementation schedules; and, a process for evaluating results and updating the action plan. Once the plan is reviewed with local stakeholders, adopted by the public agencies seeking coverage and commented upon by the MDEQ, each entity seeking coverage within the subwatershed must submit its own P2 Initiative consistent with the goals, objectives and actions outlined in the subwatershed management plan.

While the long-term goal of each plan is to achieve water quality standards, the emphasis and priorities change between subwatersheds. If the draft subwatershed plans already developed with the Rouge Project are good examples, local subwatershed plans may encompass issues that go beyond state requirements for on-site storm water retention to reduce flow variability, and for other land development controls to reduce the amount of impermeable surfaces created. The draft plans have also allowed local stakeholders to examine how, working together, they can more cost-effectively undertake actions to educate their citizens, develop monitoring plans to evaluate progress, and consider joint operations or capital improvements to address specific problems.

Integrating Subwatershed Plans

A significant concern of the federal court overseeing the clean up of the Rouge River has been how individual subwatershed management plans can be integrated to make sure that there is a comprehensive strategy for addressing basin-wide issues that cross subwatershed boundaries. The communities petitioned the federal court to delay any orders that would formally establish a basin-wide coordinating entity and allow the communities to develop their own concepts for basin-wide coordination. The communities are developing a proposal that will identify the role of a basin-wide coordinating entity, its membership, responsibilities, and financial support.

The communities have determined that most of the water quality problems are resolvable at the local subwatershed level. The need for a basin-wide entity is largely based upon economic savings that can be realized through pooling resources to create a common database and geographic information system; develop and implement a basin-wide water quality monitoring plan; and, construct predictive flow and water quality models. If pollution control trading ever matures to the point where it is widely accepted by regulatory agencies, a basin-wide entity could serve as the screener and broker for potential trades.

Future of Watershed Management

This model approach of using a general storm water permit to initiate water quality management on a watershed basis may have broad application in urban areas that fall under the federal storm water permit requirements for the first time under Phase II storm water regulations. While it falls short of a totally holistic approach to managing all discharges within the context of a single watershed plan, it at least brings currently unregulated storm water and non-point sources within a regulatory framework. Once a watershed plan is created, integrating all water quality regulatory programs so that they conform to common goals and objectives will at least be possible.

The key features of the MDEQ watershed-based, general storm water permit is its flexibility to accommodate the diversity found in various watersheds, and its bottom-up approach in establishing goals, objectives, action plans and schedules at the local level under outcome oriented guidelines provided by the state.

CONCLUSIONS

Local communities in southeast Michigan and the state regulatory agency are attempting, for the first time, a consensus, cooperative approach to storm water management and regulation under the NPDES program. The Michigan general permit is a watershed-based, general storm water permit issued under the National Pollutant Discharge Elimination System. The permit requires permittees to immediately initiate some activities such as illicit discharge elimination and to participate in watershed management planning for a self-determined subwatershed unit. The watershed management plan will form the basis for implementing watershed goals and objectives that will result in improved water quality and pollution control. This new regulatory program implements the watershed approach endorsed by USEPA and others and should facilitate watershed-based integration of control programs for different pollution sources such as storm water and combined sewer overflows which may be present with a large, urban watershed. This program empowers local government and their stakeholders in identifying problems, choosing from alternative solutions, establishing priorities and schedules, and developing common strategies with neighbors. Communities and others involved in this new program are also addressing issues such as coordination of subwatershed efforts within larger subwatersheds. It is hoped that this effort and the work of the Rouge River National Wet Weather Demonstration Project will continue to identify and quantify the benefits of cooperative, watershed-based efforts to protect and restore our nations water resources.

ACKNOWLEDGMENTS

This paper represents a summary of select elements from the ongoing efforts of many individuals and organizations who are involved in the restoration of the Rouge River. The authors also gratefully acknowledge the assistance of Ms. Sandra Kiser for her assistance in the preparation of this manuscript.

The Rouge River National Wet Weather Demonstration Project is funded, in part, by the U.S. Environmental Protection Agency, Grant #X995743-01. The material in this report has not been subject to U.S. Environmental Protection Agency (EPA) technical and policy review. The views expressed by the authors are their own and do not necessarily reflect those of EPA.

REFERENCES

Bean, C., R. Schrameck and C. Davidson (1994) "1994 Rouge River Remedial Action Plan Update." Michigan Department of Natural Resources . Southeast Michigan Council of Governments, Detroit, Michigan.

Kaunelis, V. P. and J. S. Neibert (1994) "CSOs: Two Phased Permitting for the Watershed." Paper presented at the 1994 Water Environment Federation Annual Conference, Chicago, Illinois.

Mullett, N. Jr., C. R. Bristol and K. P. Koleda (1994) "Project Technical Support: GIS / Sampling / Modeling." Paper presented at the 1994 Water Environment Federation Annual Conference, Chicago Illinois.

Murray, J. E. (1994) "Rouge River Watershed Management: Implementing a Remedial Action Plan." Paper presented at the 1994 Water Environment Federation Annual Conference, Chicago, Illinois.

Murray, J. E. and J. D. Bails (1994) "Financial/Institutional Issues: Bringing it all Together." Paper presented at the 1994 Water Environment Federation Annual Conference, Chicago, Illinois.

Schueler, T. (1996) "Crafting Better Urban Watershed Protection Plans." Center for Watershed Protection. Watershed Protection Techniques. Volume 2, No.2, pp.#329-337.

Taylor, E. W. and M. Gerath (1996) "The Watershed Protection Approach: Is the Promise About to be Realized?" Natural Resources & Environment (NR&E). Fall 1996, pp. #16-20

Figure 1. Rouge River Watershed Location Map

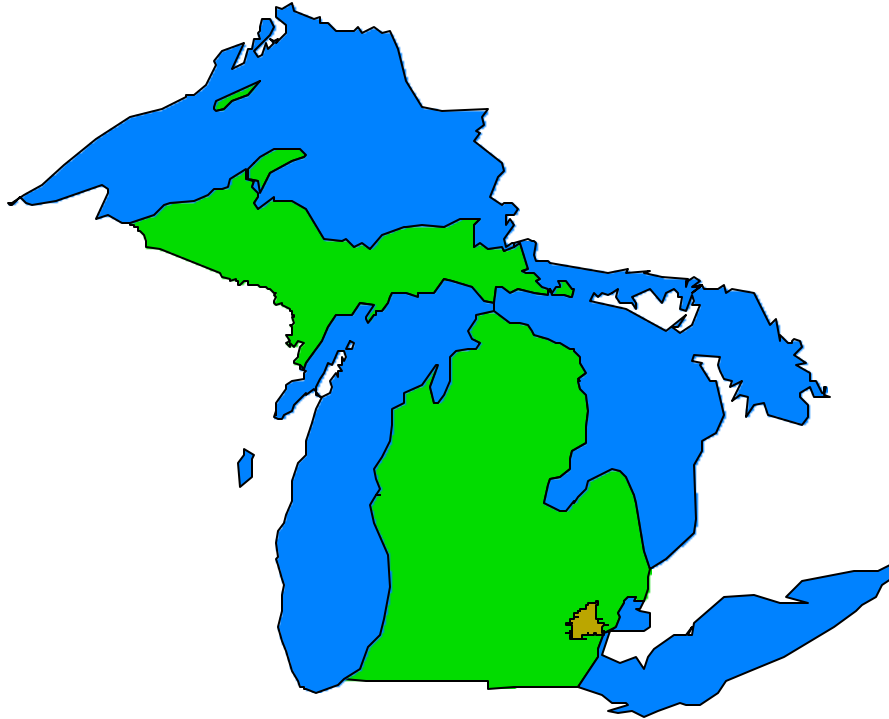
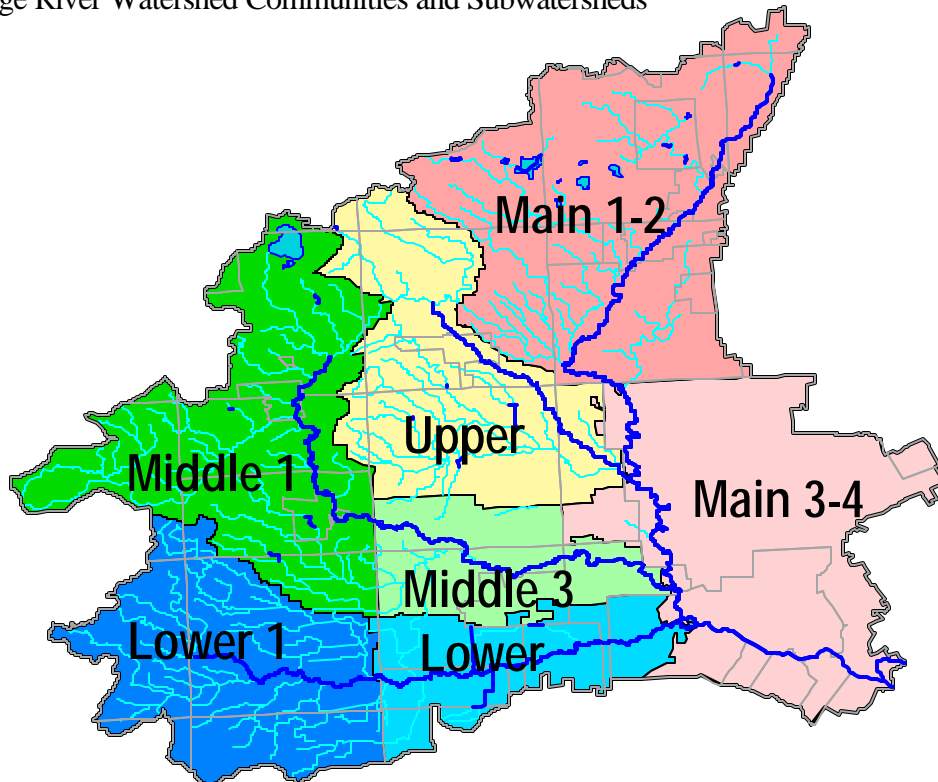


Figure 2. Rouge River Watershed Communities and Subwatersheds



KEY WORDS

Rouge River National Wet Weather Demonstration Project, Rouge Project, General Storm Water NPDES Permit, Storm Water, Institutional Arrangements, Watershed Management